

Developing Integrated and Sustained Arctic Terrestrial and Freshwater Biodiversity Monitoring Networks

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Vancouver, BC

Supporting Publication to the
Circumpolar Biodiversity Monitoring Program
Framework Document



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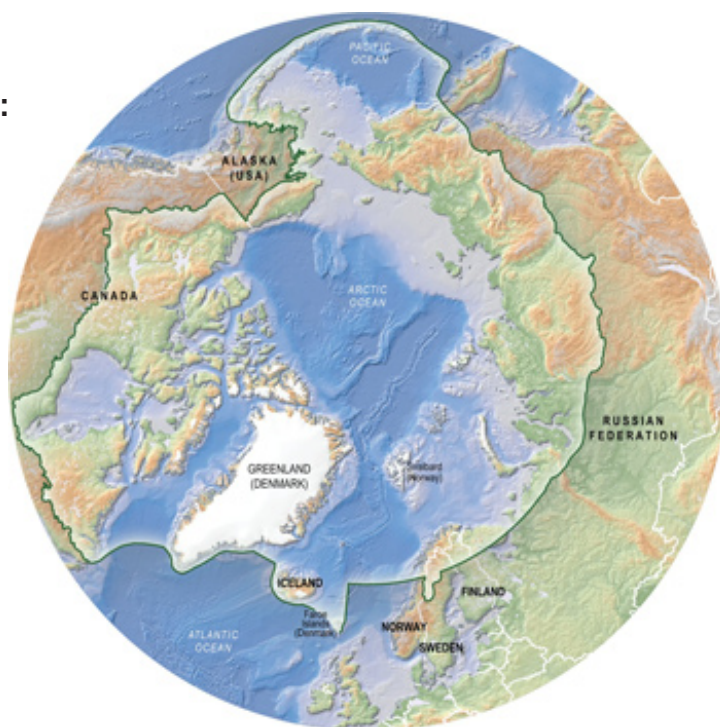
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1. INTRODUCTION

The workshop ‘Developing Integrated and Sustained Arctic Terrestrial and Freshwater Biodiversity Monitoring Networks’ was held on September 11th and 12th in Vancouver, Canada. The Circumpolar Biodiversity Monitoring Program (CBMP) convened over 45 Arctic researchers and community experts representing national and international governments, international Aboriginal organizations, academic institutions and funding agencies. The workshop was made possible with generous support from the European Research Area-Canada Initiative (ERA-Can), Environment Canada, the Canadian International Polar Year (IPY) Secretariat and the Arctic Council’s Conservation of Arctic Flora and Fauna (CAFF) Working Group.

This workshop was focused on fostering the development and implementation of coordinated, international research and monitoring networks for Arctic Freshwater and Terrestrial ecosystems and the biodiversity they support. The following document reports workshop presentations and discussions that took place during these two days, as well as the implementation plans and priority actions for convening these networks.

2. GUEST SPEAKER PRESENTATIONS

Guest speakers highlighted the CBMP and several Arctic initiatives relevant to the CBMP to provide participants with enough background to effectively engage and participate in the targeted discussions on developing integrated, Arctic monitoring networks.

Opening Remarks

Dr. Risa Smith, Senior Science Advisor/Canadian CAFF National Representative, Environment Canada

Dr. Risa Smith provided Welcoming Remarks at the beginning of Day One, highlighting the importance of the CBMP as CAFF’s cornerstone program..

Workshop Goals

Mike Gill, CBMP Chair, Environment Canada

Mike Gill introduced the **workshop goals**:

1. Identify a Multi-Stakeholder Partnership for Coordinated, Integrated and Sustained Research and Monitoring of Arctic Terrestrial and Freshwater Biodiversity.
2. Further Develop the CBMP’s Pan-Arctic Integrated Monitoring Plans for Terrestrial and Freshwater Ecosystems.
3. Establish Closer Pan-Arctic Collaboration.

4. Identify Coordinated Funding Mechanisms for Implementing and Sustaining Integrated Arctic Terrestrial and Freshwater Biodiversity Research and Monitoring Networks.

A strong emphasis was set on building implementation and action plans, and obtaining commitments regarding involvement and funding.

Overview of the European Research Area-Canada Initiative (ERA-Can)

Garth Williams, Director, European Research Area-Canada

The purpose of ERA-Can as a funding agency in Canada is to build and facilitate connections between European and Canadian researchers based on a shared scientific culture and aiming to uphold international standards of collaboration. The mandates of ERA-Can are to promote the value of international research through common funding programs, to encourage new and sustainable research collaboration in targeted/strategic areas, and to create, through supported events, opportunities for research partnerships such as this workshop (details at www.era-can.ca).

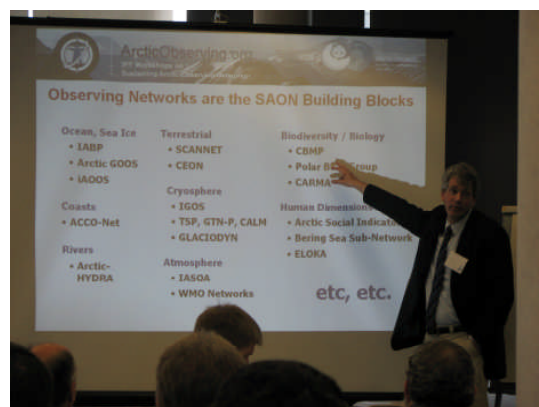


Recently, the French Presidency of the EU has identified top priorities as energy and climate change. Echoing this, the Canadian Federal Government has expressed that sub-priorities to energy and natural resources are the Arctic and climate change, as well as adaptation and monitoring related to rapidly changing conditions. ERA-Can supported this workshop as it is directly in line with its mandate to foster scientific collaboration and address issues resulting from circumpolar change through the establishment of strong monitoring networks.

Overview of the Sustaining Arctic Observing Networks (SAON) Initiative

Dr. David Hik, Director, Canadian IPY Secretariat

David explained that the SAON initiative originated from critical questions pertaining to the legacy of the International Polar Year. For example, how would data be managed, how would northern people be involved, and how would research be sustained in the Polar Regions. An important product of SAON, thus far, is a list of eight draft recommendations focusing on commitments from the circumpolar states to maintain and expand efforts to



coordinate and sustain Arctic research and observing networks involving both scientific and community-based observations from Arctic and non-Arctic countries (details at www.arcticobserving.org).

SAON meetings which occurred in Stockholm and Edmonton have identified long-term, coordinated pan-Arctic observation as an important goal and challenge, and thus consider pan-Arctic monitoring initiatives such as the CBMP as essential building blocks of SAON. At the workshop, David presented an idea considered by the World Meteorological Organization (WMO) to launch a Polar Decade. This idea initiated a discussion among participants on how to secure stable funding for long-term monitoring and thereby, extend the IPY legacy; getting commitments from Arctic national and regional governments; getting optimal value from data produced from sustained observations; and returning these findings to local people as beneficial tools to assist local decision-making and adaptation.

Overview of the Circumpolar Biodiversity Monitoring Program

Mike Gill, CBMP Chair, Environment Canada

The Arctic Climate Impact Assessment, in recognition of the increasing pressures on the Arctic's biodiversity and our limited capacity to monitor and respond to changes in the Arctic's living resources, recommended that long-term Arctic biodiversity monitoring be expanded and enhanced. In response to these recommendations, the Arctic Council's Conservation of Arctic Flora and Fauna Working Group launched the Circumpolar Biodiversity Monitoring Program (CBMP).

The CBMP is an International Polar Year (IPY) program, currently lead by Canada. It operates as an international network of scientists and local resources users working together to harmonize and enhance long-term biodiversity monitoring efforts across the Arctic in order to improve our ability to detect, understand, report on and respond to significant trends and pressures. The resulting information will be used to facilitate better conservation and adaptation actions from the global to local levels.



The CBMP is fostering cost-effective and integrated pan-Arctic biodiversity monitoring through the establishment of five Expert Monitoring Groups (EMG's) based on major Arctic themes. These EMG's (Marine, Coastal, Freshwater, Terrestrial Vegetation, and Terrestrial Fauna) will develop long-term, integrated monitoring plans and act as forums for scientists, community experts and managers where monitoring approaches are shared and promoted, thereby improving monitoring across the Arctic. The Marine EMG, co-lead by Norway and the U.S. has already been activated with membership from across the Arctic. Significant work has already occurred in developing the concepts and plans of the EMG's in previous workshops in Anchorage (November 2006) and Washington, DC (March 2008).

The current workshop is intended to facilitate the establishment of the Freshwater, Terrestrial Flora and Terrestrial Fauna EMG's through the refinement of existing monitoring concepts, identification of EMG collaborators, identification of potential leads and co-leads and the development of action plans for initiating the EMG's. The CBMP Office's role will be to monitor and facilitate the work of the EMG's and ensure linkages between the work of the five EMGs.

It was noted by workshop participants that efforts are needed to ensure that pollinators, parasites, pathogens and microbial communities are represented in the outputs of the EMG's. It was also noted that the CBMP could foster improved research and monitoring methods and approaches through the development of research and monitoring training manuals and an Arctic Research Practitioner's Guide. It was also stressed that the monitoring plans be kept simple and focused on existing capacity in order to be implemented and sustained.

Vision for a Circumpolar Freshwater Expert Monitoring Network

*Dr. Fred Wrona, Director, Aquatic Ecosystems Impacts Research Division,,
Environment Canada*

As the lead of the IPY Arctic Freshwater Biodiversity Monitoring and Research Network, Fred illustrated how a pan-Arctic freshwater monitoring network could be developed and then proceeded to outline the work to date. The first step was to establish objectives for the network and to identify metrics that could be used to meet these objectives. Subsequently, interested parties and relevant networks were identified. These networks and parties would need to be brought into the Freshwater EMG through the establishment of multi-stakeholder partnerships.

Pressures on Arctic freshwater ecosystems were identified related to charismatic species, national priorities, and local community livelihood, such as: permafrost degradation, nutrient enrichment, temperature increases, hydrological regime change, and contaminant inputs. With guidelines and limitations clarified, the development of the network is ongoing. During this workshop, Fred suggested that participants discuss linking CBMP work to individual country priorities and mandates, consider building partnerships with NGO's and industry, as well as agree on standards for metrics and reporting.

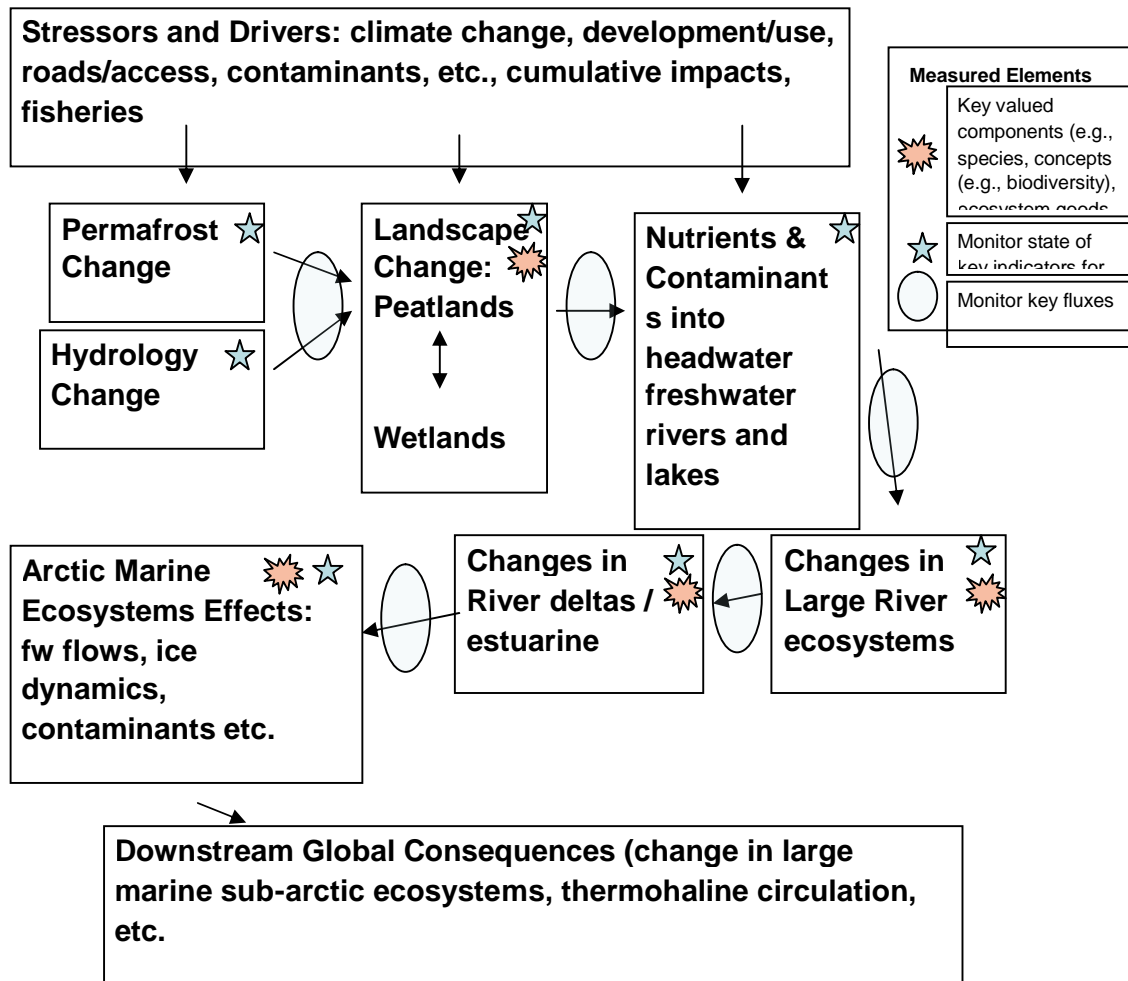


Figure 1. Conceptual Monitoring Model for Arctic Freshwater Ecosystems.

Vision for a Circumpolar Terrestrial Vegetation Expert Monitoring Network

Dr. Greg Henry, Associate Professor, Dept of Geography, University of British Columbia

The Terrestrial Vegetation EMG's would ideally be constituted of members from existing Arctic terrestrial vegetation networks which span various scales and processes. These networks already have standardized protocols and biodiversity metrics within their systems. The function of this EMG would be to develop coordinated and integrated monitoring for Arctic terrestrial vegetation systems and provide advice and guidance for pan-Arctic monitoring of terrestrial vegetation diversity. However, challenges that arise when considering working across networks include defining boundaries for the circumpolar ecosystems, reporting at multiple scales, data management and standardization, and inclusion of community-based monitoring and local knowledge. Once the data is collected and available for interpretation, there is a need to link metrics

to diversity and ecosystem functions such as energy balance, carbon flux, Net Primary Productivity, trophic level interactions, etc. The Terrestrial Vegetation EMG needs to address these concerns in order to make a significant contribution to the CBMP.

A concerted effort from the experts present to synthesize the work being done by the existing networks and to address the issues related to bridging all circumpolar knowledge on terrestrial vegetation monitoring is currently needed in order to move forward with the work of the EMG. This activity could be one of the main focuses in the initial development stages of the Arctic Terrestrial Vegetation EMG and could be addressed through a series of focused workshops.

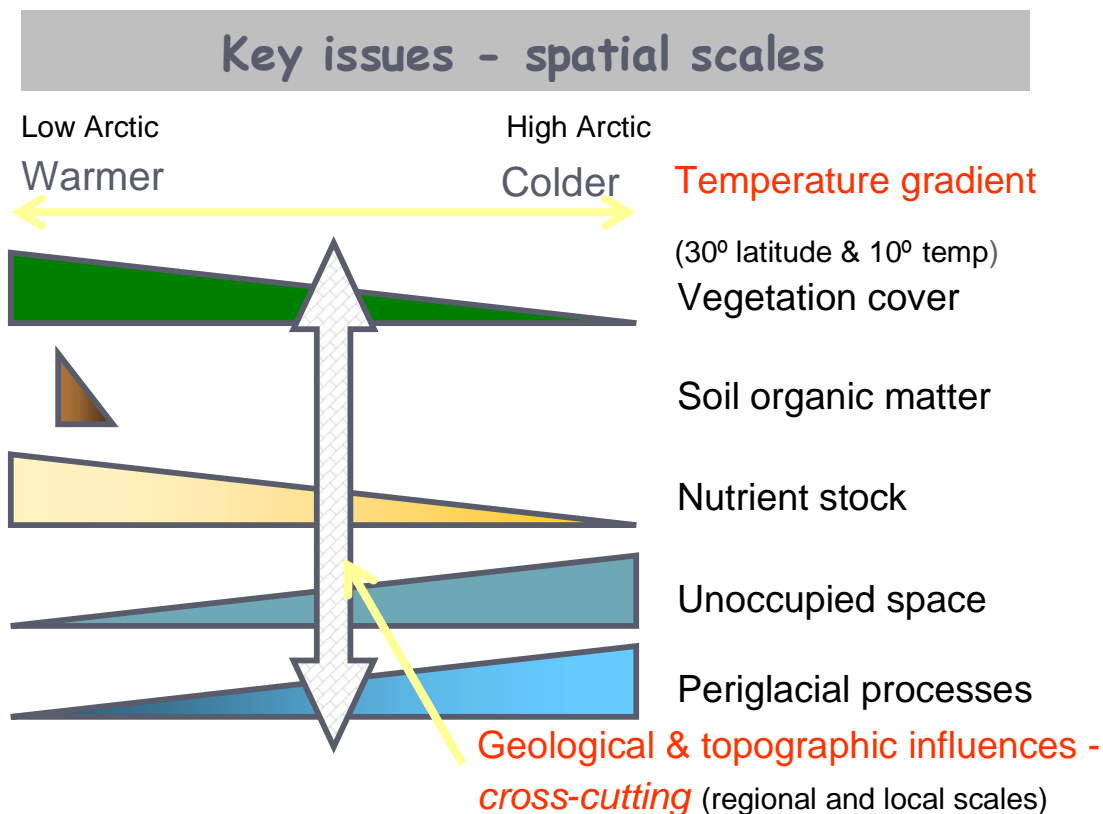


Figure 2. Relationships between latitude and ecological features in the Arctic.

Vision for a Circumpolar Terrestrial Fauna Expert Monitoring Network

*Dr. Christoph Zockler, Scientific Advisor – Arctic and Freshwater Systems,
 UNEP World Conservation Monitoring Centre*

Christoph highlighted the potential outputs from the EMG's that would attract the public's and decision-maker's attention using Terrestrial Fauna EMG outputs and indicators as examples. Examples presented included monitoring results on mammal (polar bear) and bird (goose species) species, which are either charismatic or considered

as indicators of ecosystem health. Results from such a coordinated monitoring approach could be presented via a single web-based data portal and could integrate results using a series of indices and indicators. These metrics would facilitate improved understanding of the complex patterns and processes occurring in Arctic ecosystems. The work plan for the Terrestrial Fauna EMG could be developed based on the network capacity that exists with a focus on such products as web-based indices and indicators, long-term integrated monitoring plans, status and trends reports, authoritative analyses, assessment reports, and indices for regional and habitat-specific analyses.

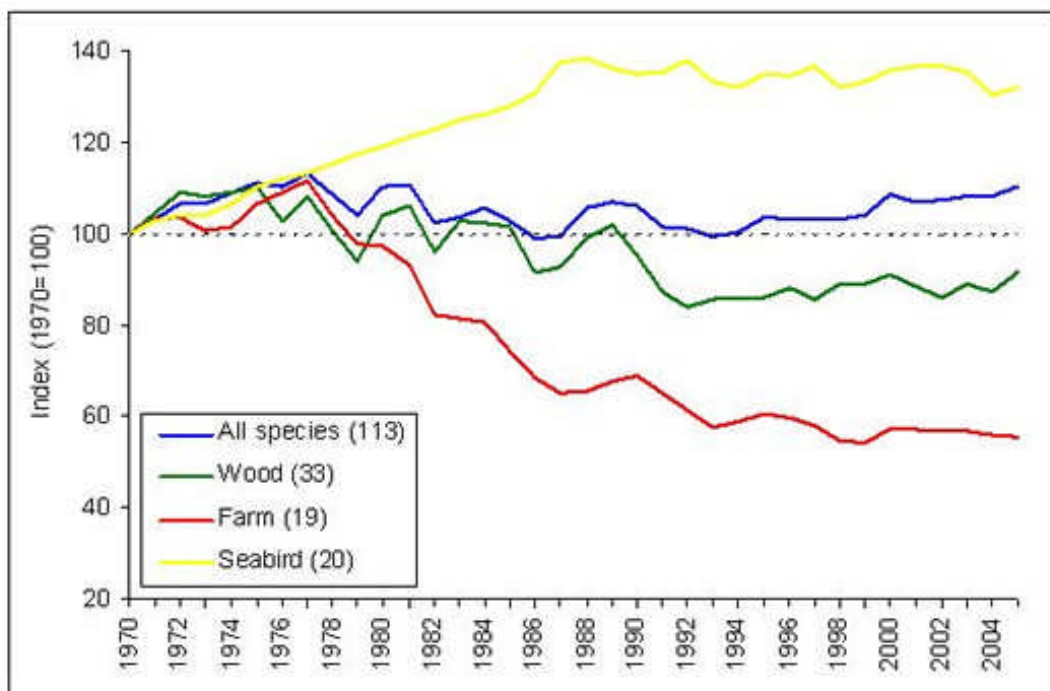


Figure 3. UK Bird Population Index as an example of potential outputs from integrated, pan-Arctic monitoring.

EMG Visions: Plenary Discussion

Following the three vision presentations, the participants raised a number of points for discussion. This included the need to improve our capacity for taxonomic identification, archiving biological specimens, and the need to include monitoring of pathogens and parasites in Arctic systems. Finally, the importance of including local people in monitoring Arctic biodiversity utilizing their local knowledge and returning findings to the communities in a customized format was highlighted.

3. PANEL DISCUSSION

Five representatives presented opportunities from their agency perspectives on current and upcoming funding opportunities for Arctic biodiversity monitoring. This was followed by a plenary discussion involving questions and comments by participants. The five agencies represented were: the Canadian Foundation for Innovation (CFI), the Natural Sciences and Engineering Research Council (NSERC), the Canadian division of the European Research Area initiative (ERA-Can), Canadian Polar Commission and Environment Canada. The panel was moderated by David Hik.

NSERC Northern and International Programs

Rick Warner – Manager, NSERC-Pacific / CRSNG-Pacifique

In 2007-2008, NSERC had a budget approaching \$1 billion. Within this budget, support for northern research could be obtained through discovery grants, scholarships and fellowships, Canada Research Chairs, and networks of centres of excellence. To promote international collaboration, researchers funded by NSERC are now allowed to go abroad with their awards. In addition, up to \$25,000 grants are available for workshops aiming to build networks with the international community. A significant proportion of the allotted money is held by visiting students and researchers recruited from abroad.

Databases are available on the NSERC website to search for award holders and to foster partnerships (www.nserc.gc.ca). An avenue for funding during the IPY has been the Special Research Opportunity (SRO) program for which a total of \$10 million per year is available, hence very competitive. The SRO program is an additional source for funding strategic workshops and critical, short-term projects of one to three years in length. More recently, NSERC convened an Expert Advisory Group to address the post-IPY legacy across Canada, which suggested immediate and long-term investments from the tri-council agencies (Canadian Institutes of Health Research (CIHR), Natural Sciences and Engineering Research Council (NSERC), Social Sciences and Humanities Research Council (SSHRC)) to sustain investments made during the IPY and allow the scientific enterprise to continue the monitoring of changing environmental and social conditions throughout the circumpolar North.



The Canada Foundation for Innovation - Research Infrastructure for Arctic Biodiversity R&D at Canadian Institutions

Meg Barker - Special Advisor, Research and Strategy, Canada Foundation for Innovation

The CFI's mandate is to 'Strengthen the capacity of Canadian universities, research hospitals, colleges and non-profit research institutes to carry out R&D through investments in research infrastructure'. Following the Science and Technology (S&T) priorities expressed by the Canadian federal government, funding will be directed to environmental science and technologies, as well as natural resources and energy. In the Arctic, these themes encompass resource production, climate change adaptation, and monitoring. The CFI infrastructure investments aim to assist in the development of international networking and collaboration.

On the Canadian polar scene, \$70 million is invested in 43 projects addressing biodiversity in the Arctic regions. At the moment, a Leading Edge Fund/New Initiatives Fund of \$400 million is made available for capitalizing on infrastructure needs and development; with, so far, 12 letters of intent for proposals falling in the domains of biodiversity, Arctic and polar research. More information on projects funded is provided at www.innovation.ca, and workshop participants are encouraged to seek partnerships with currently funded programs to enhance biodiversity monitoring capacity.

European Research Area-Canada: Increasing Opportunities for Collaboration between the European Research Area and Canada

Garth Williams, ERA-Can Director

As previously introduced, the ERA-Can mandate is to increase opportunities for collaboration between the European research area and Canada. This initiative is made possible by the collaboration between eight Canadian research organizations and the European Commission. Complete resources on collaborative projects and links to European funding calls are presented at www.era-can.ca.

ERA-Can has national contact points in Europe and in Canada (Garth is the point of contact for biodiversity). This network can assist in identifying funding opportunities and linking European experts to CBMP initiatives.

European funding is based on Framework Programs (FP) since 1984, and the seventh FP (2007-2013) is both larger and more comprehensive than earlier framework programs*. It encourages participation from around the world in order to: (1) Support European competitiveness in selected fields; (2) Encourage non-European scientists to work with European scholars; and (3) Address problems of a global character. Framework programs require that two or more countries are participating and support multi-

disciplinary research. Within the various programs constituting the FP7, the People Program and its Marie Curie Actions support mobility and training by extending funding opportunities internationally to researchers wishing to contribute to the European projects. There is currently a 2009 call under the 'Environment' theme with an overall budget of €193.5 million, to which scientists can apply until the 8th of January 2009*. Funded activities under this call include climate, ecological, earth and ocean system changes, observation systems and monitoring methods, multi-scale forecasting methods and assessment tools, and biodiversity conservation and sustainable management under the overarching theme of sustainable development.

*more information on funding opportunities is provided in Appendix 2.

Environment Canada

*Dr. Fred Wrona, Director, Aquatic Ecosystems Impacts Research Division,,
Environment Canada*

Fred raised some governmental issues related to funding of large-scale, long-term initiatives such as the IPY projects. Within Canadian governmental departments, funding is available only for specific objectives related to national concerns and departmental mandates. This creates a challenge if one wants to investigate freshwater issues since there is a minimum of five departments that deal with collection and monitoring of freshwater data. The situation gets more complex when we involve international parties due to the current lack of funding for international work within the Federal Government of Canada. The question that was raised is: how could federal departments support the EMG's? In regards to supporting a Freshwater EMG, Parks Canada, Fisheries and Oceans, Environment Canada and Northern Affairs should be key participants. Departmental mandates should evolve and allow for inter-departmental and international support for scientific initiatives, especially north of 60°. In the meantime, researchers have to set aside some time to improve their creativity in obtaining funding for initiatives of the size addressed by the CBMP.

Canadian Polar Commission

Dr. Tom Hutchinson, Chairperson, Canadian Polar Commission

Tom highlighted the need for a Northern Chair with a taxonomy degree that would create more graduate students specialized in this domain. This would require NSERC to change the focus of its funding towards identified gaps in knowledge. In a similar manner, there lacks an approach for financing capacity building in northern communities in similar ways to the University chairs. The suggestion was made for NSERC to involve northern colleges in the research and monitoring of long term projects.

The legacy of IPY, a recurring theme within this workshop, requires maintained international agreements (e.g. with the United Kingdom and France) and the financial support available should mirror this demand. There is a strong need for the continuation

of integrated proposals and support of logistics and infrastructures. A very important emphasis is to maintain northern communities' involvement as a priority after this IPY.

Finally, polar researchers should expressed their interest and support for the Canadian High Arctic Station, as promised in the Speech from the Throne, wherever it may be or whatever form it may take.

Panel discussions / recommendations

Panelists and workshop participants

- It was pointed out that although Parks Canada may not be a funding agency, they do provide research capacity such as monitoring services and research locations.
- There is a need for grants to address capacity building in northern communities to help in training outside of the university system. These grants could fill in the gap between academic research and applied skills training.
- The panelists indicated that existing grants can be identified via web search engines. This would allow people to get a better understanding of the project types funded. In response to this information, an idea for a funding workshop to be set up was put forward, in order to fully comprehend which were the most effective ways to gain sustained support for long-term monitoring projects. This workshop would ideally engage government officials responsible for setting Arctic funding priorities.



4. WORKING GROUP SESSIONS

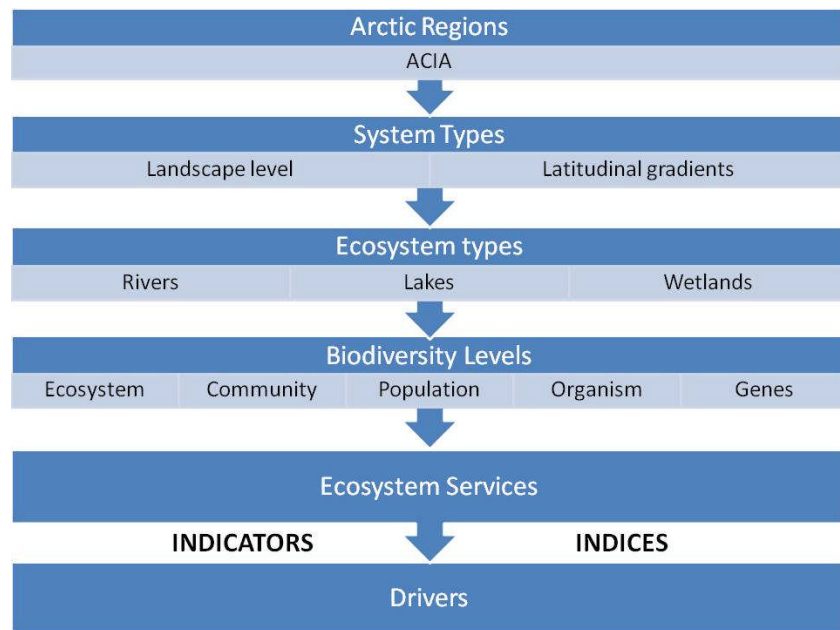
Three break-out groups were convened (Freshwater, Terrestrial Vegetation and Terrestrial Fauna) with each tasked with developing a work-plan for establishing the

EMG's that included details on which networks would be involved, who would lead them, and what outputs would be needed to meet user needs.

FRESHWATER GROUP

Lead: Fred Wrona
 Participants: Charles Greer, G. Burton Ayles, Jason Stow, Jim Reist, Joan Eamer, Kaisu Mustonen, Kirsten Christoffersen, Lilian Alessa, Sarah Adamowicz, Tatiana Minayeva

The framework for freshwater ecosystem monitoring would resemble the diagram below:



The freshwater ecosystem monitoring group structure would have two co-leads from CAFF countries and a secretariat. These people would be chosen through nomination, ratification, or volunteered. Ten to twelve core group members (experts) would be identified in the same manner from CAFF countries, other Arctic Council Working Group representatives, existing freshwater networks, Indigenous peoples networks, etc. Other informal groups would exist to provide information, review capacities, and collaboration avenues.



Drafting Terms of Reference is the first step to a work plan. Forming the group is the next priority, followed by a thorough inventory of existing networks and other monitoring efforts that will lead to a background paper detailing the status of freshwater monitoring and ways forward. Concrete linkages among the framework would then be made in coordination with CBMP, CAFF and other Arctic Council processes for inputs to CAFF's 2010 Arctic Biodiversity Highlights report, an integrated Arctic freshwater

biodiversity monitoring plan (2011-2012), and to CAFF's 2013 Arctic Biodiversity Assessment report.

List of existing networks and groups:

- Office Polar Programs (US) (FWI)
- Water Framework Directive (EU)
- Lake Net
- Wetlands International
- Ramsar convention
- IPY International Nodes (do a project scan)
- SIL/ASLO (expert/ topic/ project/ funding scan)
- Cryosphere networking
- Hydrological groups/ networks/ countries

TERRESTRIAL FAUNA GROUP

Lead: Christoph Zockler
Participants: Christine Cuyler, Dominique Berteaux, Don Russell, Erik Beever, Ian Hogg, Meg Barker, Mikhail Soloviev, Murray Humphries, Scot Nickels, Stephanie Meakin, Susan Kutz, Suzanne Carriere, Tero Mustonen, Thomas Jung

The terrestrial fauna group would involve Permanent Participants, governmental representatives, science institutions (universities, research institutes, etc.), and non-governmental organizations. Diverse groups involved also include site-based, theme-based and regional and national monitoring agencies, indigenous governments and



networks, and co-management and user groups. This variety of parties would allow for the conciliation of both community-based and scientific approaches within the monitoring strategy. Organization of the work ahead would fall under classified indices/indicators and reporting needs, as well as by issues/drivers.

Outputs expected from the Terrestrial Fauna EMG would include a background document reporting on a conceptual model for the ecosystem and including an inventory, gap analysis, and indicators/indices levels. Then, an integrated monitoring plan detailing common standards, best monitoring practices, integration tools, optimal sampling, and contributing partners would be produced. The EMG would work to integrate existing status and trend assessments, indicators, threat assessments, Arctic Report Cards, and other reports (Arctic Biodiversity Assessment, Global Biodiversity Outlook, etc.); which will enable them to build on existing research and monitoring planning processes (ICARP, etc.) and focus on existing capacity prior to spreading slowly to other regions.

The Terrestrial Fauna EMG would be ideally lead by a team of four people (1 from indigenous groups, 1 from a science-based institution, 1 from the governmental level, and 1 from an NGO or an academic institution). This group would be very closely linked with

the other EMG's, especially the Terrestrial Vegetation and Freshwater EMGs. Logically, this EMG would need adequate funding support to work at a circumpolar level, but could start regionally with pilots. Keeping track of what is needed and what is working is an essential process in the initiation stages of this EMG, as well as developing an implementation plan. Implementation could start with a pilot/case study by selecting a few networks from which the network coordinators could contribute to. Comments were offered on the importance of organizing biodiversity indicators from the local communities' perspectives.

TERRESTRIAL VEGETATION GROUP

Lead: Greg Henry
 Participants: Bruce C. Forbes, Donald McLennan, Gareth Rees, Ian Church, Jannik Hansen, Laszlo Nagy, Syndonia Bret-Harte, Tom Hutchinson

The Terrestrial Vegetation group started by listing relevant metrics for biodiversity monitoring: relative abundance/composition of vegetation, species lists, phenology, decomposition and nutrient flux, percent of landscape that has been disturbed, and change in moisture status. Possibly more than the other EMG's, the Terrestrial Vegetation EMG would really heavily on remotely sensed data. The group decided to focus on disturbed areas, herbivory (key link to the Terrestrial Fauna EMG) and possibly including paleo-data as main considerations. The establishment of monitoring sites would start by utilizing existing super sites and developing a network of basic sites located along environmental gradients that collect basic meteorological and environmental data. The boundaries were determined as being from the northern edge of boreal forest, then north to the polar desert.



Members in the Terrestrial Vegetation EMG should have expertise in vegetation monitoring and an established sensitivity to existing structures (funding and government). Membership should include northern residents and local expertise, international representatives and links to relevant existing networks. Next steps consist of conducting an inventory and review of existing networks and sites, identifying target study sites, collecting data retained by individual agencies and evaluating its quality, securing funding for initial workshops (developing standardized protocols (i.e. truthing remotely sensed data)), developing a suite of simple, repeatable and standardized protocols for circumpolar adoption (but allowing member networks to do more complex monitoring measurements), securing long-term funding from government and other partners, preparing a synthesis report for the Arctic Council, and, finally, communicating with other EMG's as the CBMP work progresses.

List of existing networks to involve in the monitoring strategy:

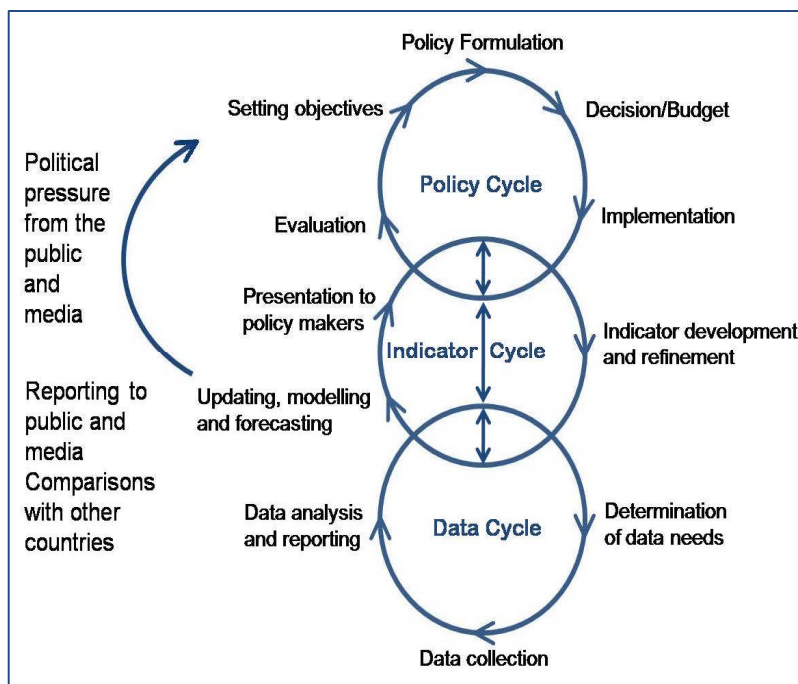
- ITEX
- SCANNET
- SpecNET
- GLORIA

- LTER Network
- NEON
- Park systems
- IPY Projects

5. NEXT STEPS AND CONCLUSION

A discussion on report backs from the breakout groups was initiated by David Hik who gave a presentation on possible cross-linkages between the EMG's. This was then followed by a lively discussion on the role, linkages and implementation of the EMGs, followed by a summary of the key suggestions for establishing the EMG's, and general conclusions.

David discussed linkages between the CBMP EMG's, specifically in terms of the realities all groups may face in their work. Unifying considerations are mainly derived from the CBMP's role as a source for reliable information serving decision-making organizations and policy development. It is important that the EMG's roles clearly involve communications to governments as well as communities and other Arctic Council working groups; hence user needs such as linkages to global issues, integration of existing data, highlighting critical monitoring gaps, and projection of future trends should remain at the forefront of the CBMP's work plan goals. These interactions were concisely illustrated with the aid of the diagram below:



From: Environment Canada,
2007. Linking Indicator
Information to the Policy
Process for Sustainable
Development: Lessons
Learned from Relevant
International Examples, The
Strategic Information
Integration Directorate.

An overall summary of what was discussed in each breakout session closely resembles the diagram above in its amalgamation of data, indicators, and future policy realms. The clear pattern that emerged for each EMG included the following steps:

- Reviewing ongoing and past activities in each domain, conducting gap analyses, and generate ***background information*** documents.
- Cumulating a list of existing ***standards/metrics*** to use in monitoring methods, and developing indicators/indices if need be.
- Developing ***predictive capacity*** in each EMG and focusing on ***existing network capacity and data***.
- Selecting indicators/indices targeted to ***user needs*** such as community well-being, conservation policies, etc.; with a balanced proportion of complementary ***research*** to link this data to overall ecosystem processes and drivers of trends.
- Securing ***international involvement***, especially from northern territorial representatives, who are essential to the CBMP EMG structures.
- Drafting ***implementation plans*** for delivery of EMG products and protocols needed to accomplish each EMG's objectives.
- Initiating ***pilot studies and demonstration projects*** of the CBMP EMG's to concentrate on what works, and eliminate what does not work as early as possible.
- Obtaining ***funding***; short term support for EMG establishment (documents, meetings, secretariats), long-term for sustainability (SAON, assessments, capacity-building, etc.)



The next steps will prioritize the creation of the Freshwater and two Terrestrial EMG's. The documented effort of this workshop will aid in disseminating the status of the EMG's and catalyze international commitment to these groups.

An effort will be made to expand the dialogue and outreach to user groups not fully represented thus far: industry, (more) communities, decision makers, (more) funders, networks from non-arctic countries, and NGO's.

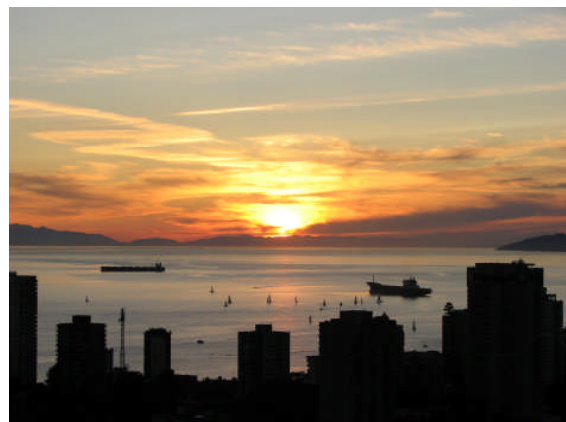
Promotion and positioning of the CBMP EMG's as critical building blocks will ensue within national and international mandates, as well as inside parent networks: CAFF, SAON, and the Group on Earth Observations Biodiversity Observation Network (GEO-BON).

Fundraising activities will proceed through official routes, such as asking CAFF commitments to lead or co-lead EMG's. Other funding sources will be sought in the short-term for workshops, background documents, syntheses and assessments, and people's time.

Other actions that the CBMP could undertake include:

- Resolving coordination between the Expert Monitoring Groups and the Arctic Biodiversity Assessment process;
- Developing CBMP capacity for regular status and trends reports and periodic assessments;
- Developing a listserv or e-forum for each EMG;
- Developing best-practices for working in the North and with communities;
- Translating relevant materials;
- Developing a small piece about the CBMP that can be put on partners websites; and,
- Updating members about funding calls and plans (posting this information on the CBMP website), such as application for the FP7 and other funding opportunities (Appendix 2)

In the upcoming months, the CBMP Office will work at keeping the CBMP profile high while implementing resolutions and recommendations from this workshop. The two days of this meeting have resulted in work plans which will contribute to future reliable, comprehensive, and sustained Arctic Biodiversity monitoring.



*Thanks to all the Vancouver 2008 Workshop participants
for a successful and enjoyable two day event*

Appendix 1. List of Workshop Participants

Workshop Chairs

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Appendix 2. List of Funding Opportunities

Source:	Nordic Council of Ministers www.norden.org Origin: Finland, Iceland, Norway, Denmark and Sweden; autonomous territories of Åland, Faroe Islands and Greenland Promotion of the indigenous peoples' living conditions and economic and cultural opportunities.
Focus:	Promotion of the indigenous peoples' living conditions and economic and cultural opportunities. Promotion of the preconditions for Nordic research with special reference to the International Polar Year 2007-2008. Promotion of the conditions for Nordic co-operation regarding climate changes in the Arctic and continuing initiatives aimed at preventing the dissemination of environmental toxins and heavy metals in the Arctic.
Deadlines:	By the end of 2008 for 2009 activities (exact date TBA)
Other:	Budget: DKK 7 million annually Suggested reading: http://www.norden.org/pub/miljo/naer/uk/US2005439.pdf

Source:	European Commission calls: The Seventh Framework Programme (FP7)
Focus:	Cooperation: Security; Space; Health; Environment (including climate change); Food, agriculture and fisheries, and biotechnology; Energy; Socio-economic sciences and humanities; Biorefinery joint call, including energy; environment (including climate change); food, agriculture and fisheries, and biotechnology; and nanosciences, nanotechnologies, materials and new production technologies. Capacities: Research for the benefit of SMEs; Activities of international cooperation; Science in society; Regions of knowledge.
Deadlines:	See specific calls at: http://cordis.europa.eu/fp7/dc/index.cfm Mostly end 2008 or beginning 2009
Other:	Budget: up to several hundred million € depending on call Funding mostly EU projects Canadian participation is strongly encouraged; but contribution has to be proven novel and necessary to obtain financial support; can be facilitated under Marie Curie actions; see: http://cordis.europa.eu/fp7/people/home_en.html

Source: **National Science Foundation - Arctic Research Opportunities**
<http://www.nsf.gov/pubs/2008/nsf08597/nsf08597.htm>

Focus: Arctic Natural Sciences; Arctic Social Sciences; Arctic System Science; and Arctic Observing Networks

Deadlines: November 18, 2008
October 15, 2009
October 15, Annually Thereafter

Other: Estimated Number of Awards: 40 per year, pending availability of funds
Budget: \$16,000,000 per year approximately
Proposals may only be submitted U.S. Organizations

Source: **European Science Foundation - EUROPOLAR ERA-NET Consortium**
www.esf.org/polarclimate

Focus: Climate variability - Northern and Southern Hemisphere Oscillations, the scales and indicators of change and the forecasting of future threats and possibilities.
The current status of snow and ice in the Polar Regions, the spatial distribution and magnitude of cryospheric stability.
Impacts of climate modification on ecosystems, bio-systems and human communities in extreme environments (Arctic and Antarctic).

Deadlines: Pre-Proposals by a deadline of Friday 24th October 2008 12:00hrs Central European time
Full Proposals deadline TBA; expected end of March 2009

Other: Budget: up to several hundred million € depending on country
Partnerships with scientists and programmes outside of Europe (e.g.; United States, Canada, China, India, Australia, etc.) are Associated Partners ideally bringing their own research funding (self-supporting) and facilities into the project. PolarCLIMATE may liaise with external non-european agencies to enable the assessment of feasibility of international partnerships and the potential for funding and access to non-European polar research stations and polar logistics.

Source: **European Commission - LIFE+ CALL FOR PROPOSALS 2008**
<http://ec.europa.eu/environment/life/funding/lifeplus/call/index.htm>

Focus: 1. LIFE+ Nature and Biodiversity projects
2. LIFE+ Environment Policy and Governance
3. LIFE+ Information and Communication

Deadlines: 21 November 2008

Other: For entities registered in the European Union
Budget: € 207,500,000
Access other funding programmes at:
<http://ec.europa.eu/environment/life/funding/otherfunding.htm>

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